Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.2621

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **5 (1):** 840-843 (2017)

International Journal of Pure & Applied Bioscience

Research Article

OPEN ACCESS

Field Evaluation of Bio Formulation KKKP and Bio Pesticides against Brinjal Shoot and Fruit Borer, Leucinodes Orbonalis Guenee under Semiarid Conditions of Tamil Nadu

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Received: 21.02.2017 | Revised: 27.02.2017 | Accepted: 28.02.2017

ABSTRACT

Experiment were done to know the efficacy of Bio-formulation viz., KKKP (2%), Neem oil (2%), GGC (2%),combination of Neem oil and GGC (1:1) and Biopesticides viz., like Baeveria bassiana and Verticillum lecanii for control of brinjal shoot and Fruit borer (BSFB) larvae, Leucinode orbonalis Guenee. The reports proved that bioformulation ie., KKKP and GGC were compared and standard checked with Endosulfan and evaluated studies suggests to be best among the microbial formulations and superior than Neem oil, in the control of BSFB infestation with considerable larvicidal properties. The annual yield data showed maximum yield on using KKKP (204.76 q/ha); Least control over BSFB is observed on Verticillium lecanii followed by the Baveria bassiana, Neem oil, mixture of KKKP and GGC, GGC, KKKP (77.8%) and maximum control with Endosulfan (84.2%) are best among Bioformulations in the IPM system on field against BSFB.

Key words: *Bioformulations, KKKP, GGC Biopesticides, Baveria bassiana Verticillium lecanii, Neem oil, Endosulfan*

INTRODUCTION

Brinjal is recognized as a popular vegetable throughout Tamil nadu in India. Mainly for its nutritional and medicinal purposes, also used in making various Indian recipies like sambar as chips in Tamil nadu. Wild varities like Manaparai brinjal is more loved by the people. India is the second largest brinjal producer in the world (about 84.5 lakh tons). Brinjal cultivation is about 8.45% of total area under vegetables in India[9]. Farmers face more economic lose on planting brinjal due to severe pest attacks like brinjal shoot and fruit borer (BSFB) *Leucinode orbonalisis Guenee* yield loss reported to be as high as 70-92 per cent[3,7]. (BSFB) causes severe injuries to both shoot and fruit of brinjal plant[11]. Farmers grow Manaparai brinjal due to its good marketing in local markets, but faceses severe loss on the next session of plantation, so they refuses to plant Manaparai brinjal to prevent themselves from loss.

Cite this article: Manoj K., Shanthi, S., Rajapandian, K. and Kavitha, P., Field Evaluation of Bio Formulation KKKP and Bio Pesticides against Brinjal Shoot and Fruit Borer, Leucinodes Orbonalis Guenee under Semiarid Conditions of Tamil Nadu, *Int. J. Pure App. Biosci.* **5(1):** 840-843 (2017). doi: http://dx.doi.org/10.18782/2320-7051.2621

Due to the threat of the BSFB pest Many Brinjal farmers stops planting the next year[4]. To control (BSFB) farmers use more toxic chemical pesticide to control them, which is banned in the Indian market like Endosulfan, in a dose that reaches the peak level beyond the recommended level. Brinjal growers usually spray two days once to control (BSFB).

Indian farmers spends 2000 to 3000 Rupees a week to buy pesticides to control (BSFB), Some farm workers used Endosulfan on spraying in high dose covered 50 cents of brinjal farmland fainted in the garden, sent to the hospital for medical help to survive has been observed weekly. Second catogerie of brinjal farmer chooses Disco brinjal varieties in Tamil nadu, which is a Genetic modulated Rdna technological brinjal to resist (BFSB). As the year passes even Disco brinjal face severe (BSFB) damage, the reason beyond Disco brinjal is made to attract the city people in its high contrast violet colour, but they lack taste of the wild varities like Manaparai brinjal, Kandam kathari, Mullkathari etc. Village people usually avoid Disco brinjal due to its lack of taste and slight bitter in taste. There are some of the native Brinjal varities which have the ability to segregate plant volatile antixenosis compounds capable of repelling (BSFB)[1]. But these compounds are found only in trace amount in the Tamil nadu wild varities.

Tamil nadu farmers have the practice of spraying chemical pesticide at least weekly two days to control (BSFB)[5] even though they are unable to prevent the loss. Due to the (BSFB) attack in Tamil Nadu the loss of brinjal yield was 20.7 – 60.0 % [10]. Due to the use of high amount of pesticide beyond the recommended level, non targeted insects like lady bird bettel, spiders, Honey bees gets killed up and extent. Also the (BSFB) Resist themselves to toxic chemical insecticides indeed. The residual toxin present in Brinjal causes severe adverse side effect on Humans and Animals. The recent adverse effect on usage of Endosulfan has been observed in Kerala sorgam village were the spread of Endosulfan in Cashew nut gardens to control pest and there ill effects on people who have been hospitalized and cancer to several health issues. Kerala government banned Tamil nadu vegetables in recent days due to utility of fatal chemical pesticide in vegetable farming. The exported goods and trucks with tons of vegetable have been sent back to the concern dealers in Tamil nadu, And farmers of Tamil nadu realized the importance of using biopesticides and bioformulations and also making themselves interested in integrated pest management as well as importance of organic farming techniques preached by therefore fathers. Therefore utility of chemical pesticide beyond the recommended permissible level must be prevented. Inorder to overcome these problems IPM strategy to control pests has been developed earlier[2], Bioformulation along with botanicals and bio-pesticides like KKKP, GGC, (Ginjer, Garlic, chilli), Neem oil, *Baveria bassiana* and *Verticillium lecanii* is recommended to the farmers, for controlling (BSFB) in IPM which is cost effective and Ecofriendly comparing with the insecticide[8].

MATERIALS AND METHODS

The field experiment were performed at, GIV farms Petavaithalai, karur (Tamil nadu), during January 2014-2015 involving control with eight treatments in randomized block design (RBD), Replications are designed with three per treatment for the control of BSFB. Manaparai is the wild brinjal variety of South Tamil nadu. The size of the plot ranges from 2m×2m having row to row spacing of 50cm×50cm. KKKP (2%), GGC (2%), KKKP (1%) +GGC (1%), Neem oil (2%), *Baeveria bassiana* @ 750 ML/ha, *Verticillium lecanii* (5g/L) and Endosulfan 35 EC (0.07%) as insecticide check along with control were used as treatments. The Insecticide were applied at 500-700 L/hectare using the knapsack sprayer, starting after 45 days of transplanting, foliar spray were done at 15 days interval, shedding of insecticide to neighboring plots are avoided. The BSFB infestation was observed frequently on shoot and fruit region. Infested number of fruits and shoot from the 5 plants per replication were recorded and number of damaged shoot to the total number of shoot of

the plant and expressed in percentage. For the Fruit borer infestation total numbers of fruits were weighed and also the infested fruit and marketable fruits were weighed and cumulative per cent of damage were worked out. The percentage data for shoot and fruit damage were subjected to average and data was provided statistically.

RESULT AND DISCUSSION

The Bioformulations and botanicals are emerging as a new solution in the integrated pest management and also new bioformulative products are introduced, to find the permanent solution to pesticidal resistance problem. In the comparative studies Endosulfan used as a standard check records the mean of 4.31 percent, both Bioformulations GGC and KKKP act as a conventional for controlling shoot damage recording 4.72 and 4.64 percent. Effectiveness was also observed in neem oil. And 8.52 and 10.25 percent shoot damage were observed in Entomopathogenic Fungi like *Baveria bassiana* and *Verticillium lecani*. The peak level of protection percent in controlling shoot damage was observed in Endosulfan than GGC and KKKP.

The presented data in Table-2 showed that Bioformulation GGC and KKKP proved to be conventional solution with the percentage ratio of 15.93 in controlling shoot and fruit borer. And brinjal fruit damage of 16.3 percent. 19.9 percent fruit damage in Neem oil, on comparison of Endosulfan with 14.23 percent, Considerable effectiveness were not found in Entomopathogenic fungus *Baveria bassiana* and *Verticillium lecanii* with the percent range of 37.7% and 38.7% respectively, in control of BSFB.

The brinjal yield report suggests KKKP (202.76 q/ha) and GGC (196.13 q/ha) proved to increase the yield on comparison with the control of (113.00q/ha) and par with Endosulfan (208.00q/ha).

2015-2016 data shows neem oil (182.03q/ha) and combustion of KKKP and GGC (187.84 q/ha) and Entomopathogenic fungi (180.079 q/ha) of brinjal yield.

Table 1: Bioefficacy of Bioformulation and microbial formulations against shoot damage by *L.orbonalis* (Polled data of 2014-2015 and 2015-2016)

Treatment	Mean	% protection against control
Neem oil	5.69^{ab}	63.2
GGC (2%)	4.72^{a}	69.5
Verticillium	10.25^{d}	33.8
KKKP(1%)+GGC(1%)	7.64^{bc}	50.7
Baveria bassiana	8.52^{cd}	45.0
KKKP (2%)	4.64^{a}	70.0
Endosulfan	4.31^{a}	72.19
Control	15.50^{e}	-

Figures in parentheses are angular transformed values; In a column means followed by a common letter are not significantly different at 5% level.

Table 2: Bio-efficacy of Bioformulation and microbial formulations against fruit damage by L.orbonalis (Polled data of 2014-2015 and 2015-2016)

Treatment	Mean	% protection against control
Neem oil	19.98^{bcab}	46.36
GGC (2%)	15.93^{ab}	57.25
Verticillium	23.18^{c}	37.77
KKKP(1%)+GGC(1%)	19.88^{bc}	46.8
Baveria bassiana	22.83^{c}	38.71
KKKP (2%)	16.30^{ab}	56.24
Endosulfan	14.23^{a}	61.79
Control	37.25^{d}	-

Figures in parentheses are angular transformed values; In a column means followed by a common letter are not significantly different at 5% level.

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